

# Opening and Setting the Tone

**Toshiaki Ikoma**

**Director-General, Center for Research and Development Strategy (CRDS), Japan Science and Technology Agency (JST)**

When GIES began two years ago, few understood the concept, but today it has been raised to the level of a real framework, including international consortia and international networking. The meeting of the present day is to be more focused on practical, concrete proposals for this framework to governments or the international community to preserve the Cool Earth 50 plan. The meeting's five important focus areas are renewable energy, natural energy usage, highly efficient transportation systems, and water and food, as well as the challenging topic of measurement of innovation and how it contributes to economic growth.

**Yuko Harayama**

**Professor, Graduate School of Engineering, Tohoku University**

Today's sessions will be more interactive. I will attempt to create one unifying language for participants from very different backgrounds: economists, government officials and academics both from within Japan and from outside Japan.

Each person has his or her own definition of and thinking about innovation. In the private sector, innovation is business as usual. For economists, it is an engine of economic growth with several economic models; it also has a theoretical definition. For government officials in Japan and Europe, innovation is mainly a policy tool. Finally, innovation is a problem-solving tool, and this perspective was the focus of this meeting.

It is possible to examine innovation in a linear model sense, starting with an idea and finally resulting in social impact. But there are several actors intervening in this process, mainly university research institutes, start-up companies and large companies. There is also a place for governments and consumers. To make innovation happen, a science base and a technology base of some kind is needed, but we do not yet understand exactly what happens on the ground. The day's task was to identify key actors in this problem by taking a system approach and adding the ecosystem approach discussed during the previous day, as well as to design practical actions. The second aspect is to establish a common understanding of the concept of GIES.

What can we add to the existing concepts and models and knowledge production? One of the directions is to think about how to induce innovation dynamics. Government has to provide the social infrastructure and promote social acceptance. We have to think about how to introduce a new value system and incentive mechanisms.

A new perspective that we would like to promote here is that we have to think beyond the existing boundaries of academic

disciplines, government institutions, corporate organizations and countries. The second perspective is that it is not sufficient to promote new technology; it should be implemented and accepted by society, which requires thinking about service innovation and promotion. The third perspective is that usually we think about the system approach, but we would like to move from a system approach to an ecosystem approach, based on the keywords of mutual dependency and reinforcing actors. The main target is to ensure openness. I expect that innovative ideas will be expressed during the day.

**T. Ikoma**

I invite each session chair to introduce the aims of their discussions.

**Hisashi Ishitani**

**Professor, Graduate School of Media and Governance, Keio University**

I will lead Session 1: Effective Utilization of Natural Energy. Energy-related innovation is one of the most important areas in addressing CO2 emission reduction and energy security issues. However, mass volume realization is needed in order to have some effect on a global scale. Also, a long-term transition is necessary; otherwise it will be quite difficult to change the system. In that sense, the government may have a very important role, while at the same time, technology is crucial to realizing such changes.

In Asian countries like Japan or China where the population density is very high, energy production efficiency is very important. The discussion would mainly focus on photobotics, solar energy and biomass. Solar energy looks very effective in the sense of the energy production area. Biomass may be a promising option in that the technical barriers are not very high. Making a decision too early or too late may have a negative effect on the possibility of realizing these systems. However, the technology is always improving, so it is very difficult judge when we should start innovative system changes. This session will seek ideas and solutions for that issue.

**Eiichi Yamaguchi**

**Deputy Director of Institute for Technology, Enterprise and Competitiveness (ITEC), Doshisha University**

I will chair Session 2: Low Environmental Impact Transportation Systems. Here we will discuss socioeconomic and technological issues for the transportation systems 10 years into the future. There are two ways to accomplish innovation. One is to analyze the current situation and find and fix the problem. The second is to dig into science and find a vision, then decrease the distance between the vision and the current situation. This session will take the second approach, with the goal of realizing low environmental impact transportation systems, as current transportation systems account for the largest proportion of the world's CO2 emissions. The session will focus on three key technologies. The first is the liquid nitrogen or liquid air thermodynamic engine, a revival of the steam engine. The second is electric

motor systems, or rechargeable battery systems. The third key technology is a paradigm-disruptive intelligent transport system (ITS), and in particular wireless information technology.

**Shinichiro Ohgaki**  
Professor, Department of Urban Engineering, School of Engineering, the University of Tokyo

I will introduce Session 3: Safe Water Supply. Water is different from ordinary agricultural and industrial products because it is an absolutely indispensable resource for human life. Water systems and water resources have many natural vulnerabilities, but also social vulnerabilities. For example, water is needed for health, but it also conveys pathogens or diseases. The supply capacity has been designed for demand and so does not have sufficient margin as a social resource. It is sensitive to natural disasters and local and international conflicts for water resources.

This discussion points for this session are as follows. One is the concept of GIES being applicable to water. Second, how to implement an innovative technology in society on the global level and indeed every level. Third, identifying what kind of bottleneck exists on global levels. Fourth, identifying the stakeholders in GIES for water. Fifth, identifying who has responsibility for the specific functions in the innovation ecosystem at all levels. Sixth, identifying any conflicts between business activity and public interests with respect to water. And seventh, how we consider social diversity, natural diversity and other diversities.

**Yoshihiro Hayashi**  
Professor, Graduate School of Agricultural and Life Sciences/  
Faculty of Agriculture; Director, the University Museum, the University of Tokyo

My session is Session 4: Stable Supply of High-Value Added Food. As discussed yesterday, the sustainable supply of consumer-satisfied safe and high value-added food is one of the most important issues for agriculture in Japan and in developing countries. In this session the participants will discuss how to encourage studies on safe and high value-added food.

Achieving the sustainable development of rural areas is one of the most important issues in both developed and developing countries. Technology to increase the value of agricultural products will increasingly be in the spotlight. This will require not only innovative technologies, but also innovative thinking. Simply providing people with food in a sufficient quantity is not enough to ensure a healthy life for human beings. This is because one's health is greatly influenced by the environment in which one lives. This is one of the reasons we need not only quantity of food, but also quality of food.

**Masahiro Kuroda**  
President, Economic and Social Research Institute (ESRI),  
Cabinet Office, Government of Japan

While the other four sessions focus on special issues in the natural sciences, Session 5: Measuring Innovation: What is the measure for "Outcome" of Innovation and How to evaluate "Effect of the Policy Instruments" will discuss the broad topic of measurement of innovation, which brings in the important science of social policy. There needs to be collaboration between natural sciences and social sciences.

Why does measuring innovation matter? We must lead some innovation to achieve a sustainable society in the future. But if we do not have any concept of how to measure innovation, we cannot evaluate the outcome of the innovation itself, nor consider how to create innovative societies. This session would ask how the outcomes of innovation can be measured, and what the factors are to promote innovation. How can input for innovations be measured, and how can the relationship between innovation and economic growth be measured? What can be done to drive our economy to continuous and sustainable growth by making our countries more innovative?

**T. Ikoma**  
Each of these topics is very different, but they share the keywords of the Global Innovation Ecosystem: science-based innovation, innovation ecosystem and global framework, either collaborative or competitive. At the end of the session, each group should make a clear proposal on what actions to take to move one step towards enabling the GIES to resolve global issues, followed by a wrap-up session in which actions to be taken would be summarized and subsequently posted on the GIES website. These sessions should be very useful and a real step forward for the GIES.